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United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine

INFORMATION ABOUT BEE CULTURE

Most persons appreciate that the only source of honey and beeswax is the honey bee. Few realize, however, that, although this insect in the United States produces in excess of 200 million pounds of honey and 4 million pounds of beeswax annually, these are merely by-products, and that its principal role is in the pollination of some 50 agricultural crops for the production of seed and fruit. While many other insects are of value as pollinators, their numbers have been so depleted in the course of agricultural development that they can no longer be relied upon. In practically all agricultural areas honey bees are now the most numerous flower-visiting insects. The transfer of pollen from flower to flower is so essential that beekeeping must be carried on to maintain a profitable agriculture.

Many persons own bees, but not enough keep bees efficiently or make beekeeping a specialty. Efficiency in beekeeping is based upon a thorough knowledge of the life and behavior of bees, the proper use of equipment, and careful attention to marketing problems.

This circular lists various publications giving information on bee culture, including those issued by the Department of Agriculture and its various agencies, State cooperative publications, and books and journals on beekeeping. It also lists the bee supply houses and beekeeping organizations. In addition, the beekeeping activities of the Department of Agriculture are outlined and a few paragraphs giving advice to beginners in beekeeping are included. If your beekeeping questions are not answered in this and other Department publications, the Bureau of Entomology and Plant Quarantine will be glad to render further assistance. Address all inquiries to: Division of Bee Culture, Agricultural Research Center, Beltsville, Md.

UNITED STATES DEPARTMENT OF AGRICULTURE PUBLICATIONS

A limited supply of some of the following publications is available for free distribution. However, all are obtainable by purchase from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., or can be consulted in libraries. Do not send money or any other kind of remittance for publications to the Division of Bee Culture.

Farmers' Bulletins: Cents

961, Transferring Bees to Modern Hives.....5
1713, Treatment of American Foulbrood.....5

Circulars:

386, The Wax Moth and Its Control.....5
392, Diagnosing Bee Diseases in the Apiary.....5
554, Honey and Pollen Plants in the United States.....10
650, Factors Affecting Usefulness of Honey Bees in Pollination.....10
702, Productive Management of Honey Bee Colonies in the Northern States.....10

Technical Bulletins:

656, Cost of Producing Extracted Honey in California..10
716, Investigations of the Physical and Chemical Properties of Beeswax.....5

Leaflet 113, Honey and Some of Its Uses.....5

The following publications of the Bureau of Entomology and Plant Quarantine are obtainable without cost from that Bureau, Washington 25, D. C., or from the Division of Bee Culture.

E-297, List of Dealers in Beekeeping Supplies, Package Bees, and Queens.
E-531, The Use of Pollen Traps and Pollen Supplements in Developing Honey Bee Colonies.
E-536, The Role of Pollen in the Economy of the Hive.
E-584, The Dependence of Agriculture on the Beekeeping Industry.
E-693, Two-Queen Colony Management.
E-749, Bee-Gathered Pollen in Various Localities on the Pacific Coast.
E-763, Tests with DDT on Honey Bees in Small Cages.
ET-250, A Manual for the Artificial Insemination of Queen Bees.

Other information issued by various bureaus in the Department of Agriculture is indicated below:

Semimonthly Honey Report. This report, issued on the 1st and 15th of each month, gives quotations on honey and beeswax, the condition of bees and honey plants, data on imports and exports of honey, and other pertinent information relating to the marketing of honey and beeswax. Copies are available without cost through the Production and Marketing Administration, Washington 25, D. C.

Production Statistics. Honey and Beeswax Production, 1948. Gives statistics on the number of colonies, and production of honey and beeswax. Available without cost from the Bureau of Agricultural Economics, Washington 25, D. C. A report on the number of queen bees and pounds of package bees shipped in 1948 is available from the same source.

United States Standards for Grades of Extracted Honey, effective March 15, 1943. Copies available without cost through the Production and Marketing Administration, Washington 25, D. C.

Organizing Honey-Marketing Cooperatives in Wartime. Farm Credit Administration, Miscellaneous Report 79. Copies can be obtained from the Farm Credit Administration, Washington 25, D. C.

Motion Picture Film. "The Realm of the Honey Bee." This is a four-reel film showing the life history and behavior of the honey bee. It is replete with close-ups of bees gathering nectar and pollen, performing the "food dance," and driving out drones and robber bees. It shows how bees sting, and also records a fatal encounter between rival queens. The film closes showing how honey is removed from the hives and prepared for market, and a few of the ways in which honey can be used. Copies of this film in 35-millimeter width may be purchased through the Motion Picture Service, Office of Information, U. S. Department of Agriculture, Washington 25, D. C. Copies in 16-millimeter width may be purchased direct from Castle Films, 30 Rockefeller Plaza, New York 20, New York.

Slidefilms. The following slidefilms, produced for the Department of Agriculture, are available from Photo Lab, Inc., 3825 Georgia Ave., N. W., Washington 11, D. C., at the prices indicated:

	Single frame	Double frame
151, The Anatomy of the Honey Bee.	$ .50	$1.00
171, Diagnosis of Bee Diseases in the Apiary	.55	-
346, First Lessons in Beekeeping.	.50	-
616, Transferring Bees to Movable-Frame Hives.	.50	1.00

COOPERATIVE STATE PUBLICATIONS

The following State publications, reporting investigations in cooperation with the United States Department of Agriculture, can be obtained from the indicated State Agricultural Experiment Station or consulted in libraries:

Costs and Practices in Producing Honey in Oregon, by A. S. Burrier, Frank E. Todd, H. A. Scullen, and William W. Gorton. Oregon Agricultural Experiment Station, Bulletin 362. 1939.

The Distribution of California Buckeye in the Sierra Nevada in Relation to Honey Production, by George H. Vansell, William G. Watkins, and L. F. Hosbrook. California Agricultural Experiment Station. 1940.

Nectar and Pollen Plants of Oregon, by H. A. Scullen and George H. Vansell. Oregon Agricultural Experiment Station, Bulletin 412. 1942.

The Beginner Beekeeper in Louisiana, by E. Oertel. Louisiana State Department of Agriculture and Immigration. Ed. 2, 1947.

Honey Bee Losses as Related to Crop Dusting with Arsenicals, by S. E. McGregor, A. B. Caster, and Marvin H. Frost, Jr. Arizona Agricultural Experiment Station, Technical Bulletin 114. 1947.

Beekeeping near Cotton Fields Dusted with DDT, by S. E. McGregor and C. T. Vorhies. Agricultural Experiment Station, University of Arizona, Bulletin 207. 1947.

Pollen and Nectar Plants of Utah, by George H. Vansell, Agricultural Experiment Station. Utah State Agricultural College, Circular 124. 1949.

BEE SUPPLY HOUSES

C. W. Aeppler Co.	Oconomowoc, Wis.
Dadant and Sons	Hamilton, Ill.
Diamond Match Co.	Chico, Calif.
Walter T. Kelley Co.	Paducah, Ky.
Leahy Manufacturing Co.	Higginsville, Mo.
G. B. Lewis Co.	Watertown, Wis.
August Lotz Co.	Boyd, Wis.
Fred W. Muth Co.	Cincinnati, Ohio
A. I. Root Co.	Medina, Ohio
Williams Brothers Manufacturing Co.	Portland, Oregon
A. G. Woodman Co.	Grand Rapids, Mich.
Superior Honey Co.	Ogden, Utah and Los Angeles, Calif.

See also: List of Dealers in Beekeeping Supplies, Package Bees, and Queens. U. S. Bur. Ent. and Plant Quar. E-297.

BOOKS ON BEEKEEPING

Books for sale by bee supply houses (see p. 4) and book dealers. Prices are approximate. Some of these books may be in your public library.

Beekeeping Management for Honey Production:

ABC and XYZ of Bee Culture (1948)	A. I. and E. R. Root	$3.75
Beekeeping (1928)	E. F. Phillips	4.00
Beekeeping in the South (1920)	Kennith Hawkins	1.00
Dadant System of Beekeeping (1932)	C. P. Dadant	1.00
First Lessons in Beekeeping (1943)	C. P. Dadant	1.00
Five Hundred Answers to Bee Questions (1942)	Geo. S. DeMuth	.50
Hive and the Honey Bee (1949)	Roy A. Grout	4.00
Honey Getting (1948)	E. L. Sechrist	1.00
How to Succeed with Bees (1930)	Atkins and Hawkins	.55
Langstroth on the Hive and Honey Bee (1927)	C. P. Dadant	2.00
Living from Bees (1946)	Frank C. Pellett	2.50
Outapiaries (1919)	M. G. Dadant	1.00
Productive Beekeeping (1923)	Frank C. Pellett	3.00
Starting Right with Bees (1945)	H. G. Rowe (revised by E. R. Root)	.75

Queen Rearing:

How to Grow Queens (1938)	Walter T. Kelley	.50
Practical Queen Rearing (1945)	Frank C. Pellett	1.00
Queen Rearing Simplified (1923)	Jay Smith	1.25
Queen Rearing (1946)	L. E. Snelgrove	5.00
Better Queens (1949)	Jay Smith	4.00

Miscellaneous:

American Honey Plants (1947)	Frank C. Pellett	2.00
Anatomy and Physiology of the Honey Bee (1925)	R. E. Snodgrass	3.50
Beekeeping as a Hobby (1941)	Kyle Onstott	2.00
Beekeeping for Pleasure and Profit (1943)	Addison Webb	2.00
Bee Venom Therapy (1935)	Bodog F. Beck (M.D.)	5.00
City of the Bees (1949)	Frank S. Stuart	3.00
Golden Throng (1940)	Edwin Way Teale	5.00
History of American Beekeeping (1938)	Frank C. Pellett	2.50
Honey and your Health (1944)	Bodog F. Beck and Doree Smedley	3.00
Honey Plants of North America (1926)	John H. Lovell	1.50
Life of the Bee (1904)	Maurice Maeterlinck	3.00
Mystery of the Hive (1923)	Eugene Evrard	2.50
The Bee Hunter (1949)	George Harold Edgell	2.50

BEE JOURNALS

The following are issued monthly at about $1 to $2 per year:

American Bee Journal, Hamilton, Ill.
Beekeepers' Magazine, Lansing, Mich.
Bees, Hapeville, Ga.
Gleanings in Bee Culture, Medina, Ohio
Modern Beekeeping, Paducah, Ky.

ORGANIZATIONS IN THE BEEKEEPING INDUSTRY

American Bee Breeders Association---J. F. McVay, Secretary-Treasurer, Jackson, Ala.

American Beekeeping Federation---Glenn O. Jones, Secretary, Atlantic, Iowa. A national organization of beekeepers comprised of State and county beekeepers' organizations and individual beekeepers. Annual dues $5.00.

American Honey Institute---Mrs. Harriett M. Grace, Director, Commercial State Bank Building, Madison, Wis. An organization sponsored and supported by bee-supply companies, beekeepers' organizations, and individuals. Its purpose is to give publicity to honey through demonstrations, lectures, radio talks, honey recipes, and other literature.

Apiary Inspectors of America---F. L. Thomas, Secretary, Texas Agricultural Experiment Station, College Station, Tex.

Bee Industries Association---R. H. Dadant, Secretary, Dadant and Sons, Hamilton, Illinois. Representing supply manufacturers.

Honey Bee Improvement Cooperative Association---Charles A. Reese, Secretary, Ohio State University, Columbus, Ohio. A non-profit organization to promote the distribution of improved strains of the honey bee.

National Honey Association---Frank L. Swanson, Secretary, 1028 Third St., Council Bluffs, Iowa. Representing commercial bottlers of honey.

State Beekeepers' Organizations---A beekeepers' association exists in practically every State. Information about such associations can usually be obtained through your State Department of Agriculture or your Agricultural College or Experiment Station.

Southern States Beekeepers' Federation---E. C. Hansen, Secretary, Livingston, Ala. An organization of honey producers, shippers of package bees, and queen breeders devoted to the interest of beekeeping in the Southern States.

U. S. D. A. BEEKEEPING ACTIVITIES

Research work on beekeeping by the U. S. Department of Agriculture is centered in the Division of Bee Culture of the Bureau of Entomology and Plant Quarantine. This Division has its headquarters at the Agricultural Research Center, Beltsville, Md. Jas. I. Hambleton is in charge. The Division of Bee Culture maintains the following field laboratories:

Arizona---Southwestern States Bee Culture Laboratory at Tucson. Frank E. Todd, in charge. Cooperating with the Agricultural Experiment Station of the University of Arizona.

California---Pacific States Bee Culture Laboratory at Davis. Geo. H. Vansell, in charge. Cooperating with the California Agricultural Experiment Station, the University of California, and the Oregon Agricultural Experiment Station.

Louisiana---Southern States Bee Culture Laboratory, University Station at Baton Rouge. Warren Whitcomb, Jr., in charge. Cooperating with the Louisiana Agricultural Experiment Station and the University of Louisiana.

Ohio---Queen-rearing yard on Kelley's Island, Ohio. W. C. Roberts, in charge. Cooperating with The Honey Bee Improvement Cooperative Association.

Oregon---Sub-laboratory at Corvallis, Oregon. H. A. Scullen, in charge. Cooperating with Oregon Agricultural Experiment Station and the Oregon State Agricultural College.

Wisconsin---North Central States Bee Culture Laboratory, University of Wisconsin at Madison. C. L. Farrar, in charge. Cooperating with the Wisconsin Agricultural Experiment Station and the University of Wisconsin.

Wyoming---Intermountain States Bee Culture Laboratory, University of Wyoming at Laramie. A. P. Sturtevant, in charge. Cooperating with the Wyoming Agricultural Experiment Station and the University of Wyoming.

In addition the Division of Bee Culture cooperates with the Division of Cereal and Forage Insects of the Bureau of Entomology and Plant Quarantine; the Bureau of Plant Industry, Soils, and Agricultural Engineering; and State agencies in studying factors affecting the production of legume seed, particularly those concerned with insect pollination. The work is being done at the following field laboratories:

Ohio---Legume Seed Research Laboratory, Columbus. A. W. Woodrow is in charge of the insect-pollination phases. Cooperating State agencies: Ohio State University and Ohio Agricultural Experiment Station.

Utah---Legume Seed Research Laboratory, Logan. George E. Bohart is in charge of the insect-pollination phases. Cooperating State agencies: Utah Agricultural College and Utah Agricultural Experiment Station.

ADVICE TO BEGINNERS

Beekeeping is a specialized industry requiring fundamental knowledge of bee behavior and a genuine liking for handling bees. Locating colonies close to available sources of nectar is important, since to insure good crops the bees should be within flying range, that is, within 1 or 2 miles, of an abundance of nectar-secreting plants. Good beekeeping locations are found in practically every State, so that the selection of apiary sites resolves itself into choosing locations where nectar-secreting plants occur in profusion and where living conditions are desirable.

With proper experience and a liking for bees, a person in a favorable location can obtain from beekeeping a return that compares favorably with that from most agricultural pursuits. Beekeeping, however, can easily become a profitless undertaking, and to avoid this we advise beginners not to invest heavily. Practical knowledge gained through a season's work with an experienced beekeeper should be invaluable to a beginner. If a person cannot spend time with a beekeeper, the next best thing is to acquire two or three colonies and do the best he can. A number of State educational institutions offer resident or correspondence courses in beekeeping.

A common method of starting a colony is to purchase a package of bees, preferably 3 pounds, with a queen and to install this package in a hive equipped with frames containing full sheets of brood foundation. Instructions for installing usually accompany the package.

The best time to begin beekeeping with either package bees or established colonies is in the spring, when fruit trees are in bloom.

If established colonies are purchased, they should be (1) in modern hives, (2) acquired from a reliable beekeeper, and (3) accompanied by a certificate of inspection to insure freedom from disease.

A beginner's outfit may consist of the following items, although it is suggested that catalogs from some of the bee supply houses be consulted for comparable information:

1 10-frame hive, consisting of:
- 1 bottom board
- 2 10-frame hive bodies complete with frames and brood foundation
- 2 to 4 shallow supers complete with frames and thin super foundation
- 1 outer cover and 1 inner cover

1 3-lb. package of bees with queen
1 smoker
1 bee veil
1 hive tool
10-15 lb. of granulated sugar
4 oz. of No. 28-gage wire
Spur imbedder

Such outfits, including a subscription to a bee journal, cost approximately $20. The equipment can be varied, and more can be added after a person has become experienced and learns how to manage large colonies. The standard 10-frame hive is the type generally used in the United States.

While factory-made equipment ordinarily gives the most satisfactory results, some beekeepers prefer to construct their own beehives. If this is done, it is a good plan to purchase or borrow a complete hive to use as a model. It is essential that all dimensions be carefully adhered to; otherwise the bees will build combs and add propolis where it is not desired. Likewise careful construction is necessary so that all hive parts are readily interchangeable.

The Italian bee is the kind recommended for the beginner in this country. It is hardy, industrious, and fairly gentle, and can be readily obtained in pure stock since it is the bee most commonly kept in the United States.

You should consult your Agricultural College, State Department of Agriculture, or Agricultural Experiment Station for information on State beekeeping publications, extension work in beekeeping, inspection service, good beekeeping locations, beekeeping associations, and the like.

CARDINAL POINTS TO BE OBSERVED IN KEEPING BEES

1. Bees need an abundant store of honey (25 or more pounds during the active season and 50 to 60 pounds during winter), pollen, plenty of room for brood rearing, a source of water, protection from the wind, and exposure to sunlight.

2. Swarming results in the loss of honey, and therefore should be controlled.

3. There should be empty comb space in the hives at all times preceding and during a honey flow. If every cell becomes occupied with brood, pollen, or honey, the bees will swarm or stop working, in either case causing a loss of honey if just before or during a flow.

4. For successful wintering a colony should have a young queen of high-producing stock, a large cluster of young, fall-raised bees, 60 or more pounds of sealed honey, and several combs containing large areas of pollen. For these requirements a colony must have a 2-story standard hive with a gross weight, in October, of about 130 pounds.

5. It is unprofitable and, in many States, illegal to keep bees in box hives or "gums."

6. It does not pay to cultivate any plant for bees alone. Nectar resources may be improved, however, by planting such crops as sweetclover on waste lands.

7. Starvation is one of the principal causes of unprofitable beekeeping. If bees are short of honey stores, a syrup of two parts of clean granulated sugar to one of water should be fed. Plan carefully and avoid having to feed the bees by leaving them plenty of honey at all times.

8. Diseases of bees cause large annual losses of bees, honey, and equipment. Beekeepers should learn to recognize the symptoms, particularly of American foulbrood.

DISEASES OF BEES

Although it is normal to find a few dead bees at the entrance of a hive, the presence of large numbers should cause the beekeeper to examine the colony for some abnormal condition. The presence of trembling or paralyzed bees, or of bees crawling and apparently unable to fly, should arouse suspicion. Two of the commonest abnormal conditions of adult bees are poisoning by insecticides and Nosema disease. A laboratory diagnosis can be made for Nosema disease and insecticide poisoning, although at times a diagnosis of any abnormal condition of adult bees may require actual observation of the colony affected.

In many parts of the country beekeepers suffer losses from American or European foulbrood, the two most serious brood diseases. European foulbrood can be controlled by proper corrective measures, but American foulbrood, the more serious and prevalent of the two, requires a more drastic treatment. The bees and combs of colonies infected with American foulbrood should be burned.

Apiary inspection is a function of the States, and is maintained by most State Departments of Agriculture, to which should be referred all questions concerning apiary inspection, diagnoses, and proper methods of control. As a service to beekeepers, however, the Division of Bee Culture examines, without cost, samples of brood and adult bees. Reports of these diagnoses are sent to the beekeepers and copies to the proper State apiary officials.

For diagnosing brood diseases, send a sample of comb about 4 by 4 inches containing the affected brood or brood remains. Avoid including any honey if possible. For diseases of adult bees, send from 100 to 200 (preferably the latter) sick or dead bees. Mail all samples in a wooden or heavy cardboard box. Do not use tin, glass, or waxed paper. Address all samples to the Division of Bee Culture, Agricultural Research Center, Beltsville, Md.